

in the skin and deeper tissues. The spinal needle used is about  $4\frac{1}{2}$  to 5 inches in length, and 22 gauge. With the index finger resting on the spinous process of the fifth lumbar vertebra, the needle is passed through the wheal upward and medially, continuously pointing to the direction of the spine of the fifth lumbar. The upward angle is about 55 degrees, approximately the angle that the dorsal surface of the sacrum makes with the overlying skin at this point. The medial angle varies with the width of the sacrum, but the needle is so directed that it will be in the midline at the lumbosacral space. Care should be taken when directing the needle that it does not come in contact with the periosteum with much force as this may be a cause of much discomfort to the patient. In passing through the deeper structures the needle follows the course of the sacrum to the lumbosacral space. If the needle comes in contact with the bony structures its direction is changed slightly and advanced slowly and carefully. The sensations felt by the operator as the needle advances are about the same as one experiences in a higher puncture, and the characteristic feel is noted as the dura is penetrated.

In most cases as soon as the space is reached the spinal fluid appears, but not as forcefully as in the higher puncture in the side position. In some cases it is necessary to withdraw the spinal fluid. About 1 to 3 cc. of fluid are withdrawn, and to this 150 mg. of novocain and 5 mg. of pontocain are added, depending on the particular case and work to be done. This solution is slowly reinjected into the spinal canal. The response to the novocain is immediate. If a rectal operation is to be done, the patient is usually left in the same position; however any position can be used without harm to the patient if the rules of gravitation are applied the same as with the higher spinal. The blood pressure is recorded at short intervals and the patient should now be resting quietly. The Trendelenberg position can be used, the degree of which depends on the type of operation and other factors.

#### COMMENT

The advantages of this type of block are many. For most patients, lying in the prone position is much more comfortable than on the side in a flexed cramped position. However in some cases, when the patient cannot lie on the abdomen, the lumbosacral approach can be done with the patient on his side, but it is not necessary to flex the body to any great degree. This factor alone is of great advantage in obstetrical cases where a low block is desired for delivery.

This approach is of great value in those cases that are not able to bend their spine due to some pathological condition, such as arthritic changes or tuberculosis of the spine, or possibly a congenital bony defect.

This approach may be about the only method of procuring spinal fluid in meningitis and the accompanying opisthotonos. There is less fall in blood pressure and therefore less shock for the patient with this method. It is also a great advantage to the operator doing a prostatic resection not to have a great drop in the patient's blood pressure as all bleeding points can be stopped at the time of operation with no likelihood of hemorrhage from a rise in blood pressure after the patient has returned to his room. It is thus a safer anesthetic for the old and for those who are poor risks. Furthermore it is such an easy method that it can be used in the office without an assistant to hold the patient.

A review of one hundred of my cases done in a private hospital reveals the interesting fact that the average drop in blood pressure was only 10.8 systolic, and 6.5 diastolic. In fifteen cases there was no change in blood pressure. In a few cases one-half ampoule of ephedrine was used before injection. The average age of the patients was 67;

the youngest being 16, and the oldest 86 years. Only two patients had headaches which occurred shortly after surgery, but these could not be directly attributed to the anesthetic.

The cases in which this block was used were mostly urological; 48 cases were prostatectomies, transurethral, perineal, and suprapubic. There were cases of bladder fulguration, vasectomies, cystotomies. There were 19 hemorrhoidectomies and other rectal operations. The balance of the group included cervical biopsies, cauterizations, and various vaginal repairs. There were no complications of any notable degree recorded.

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#### PUBLIC HEALTH BACTERIOLOGY\*

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**B**ACTERIOLOGY and its allies (serology, immunology, mycology, parasitology, and virology) cease to become separate entities and merge under the larger field—Medicine.

It would be easy to indulge in histrionics to which the laboratory is so well adapted and which have so often been used. The creed of medicine has no place for histrionics and fantasy. We could presume, with pure speculation, that there must be a prize greater than the sulfa drugs and penicillin, just around the corner. There have been discoveries; there will be more.

#### PHYSICIANS IN RELATION TO PUBLIC HEALTH LABORATORIES

There are three general ways in which the relationship between physicians and the public health laboratories of tomorrow will be strengthened.

First—from these laboratories will come information which will give us a stronger hold on our knowledge of the etiology of infections. The background for much of our knowledge of diagnosis, treatment, and epidemiology hinges on an understanding of the etiology. This will help in many diseases, the etiology of which is not known or not understood. Differential diagnosis is increasingly difficult and dependent upon the laboratory. We are encouraged by glimpses of possible order to come in the confusing groups of diseases caused by viruses, rickettsiae, and yeasts and moulds. In the practice of a physician and in the epidemiologic control of infection, knowledge of the etiology has been a significant key in development. We may lose our grip on bacteriologic technicalities but we cannot afford to lose it on etiology and on diagnosis.

Second—we are sure to have significant technical improvements in the laboratories. We are likely to overlook the influence of these technical improvements on medical practice and public health. For example, there are thousands of culture media, and the adding of one or two more seems inconsequential. Wilson and Blair devised a medium which permits typhoid bacilli to grow as black colonies while almost everything else is inhibited. Leifson devised a desoxycholate medium and the Difco Laboratories prepared a *Salmonella-Shigella* medium known as SS medium. While these developments occurred some dozens of other culture media were added to the thousands that exist, yet the addition of these three has improved the quality of laboratory work in con-

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nection with enteric infection so much that epidemiologic data are changing.

The third of these general shifts is a change in attitude. The increasing complexity of our existence is forcing specialization, whether or not we approve. The day has gone when the physician was also an expert technician. He must turn over the burden of technical knowledge of the laboratory to the technicians and end the pretense of expert knowledge. He will have all that he can manage to learn how to secure specimens, when to get them, what to do with them, and how to interpret the reports sent to him from the laboratory. He will do well to give to the laboratory the information that it needs to examine specimens intelligently. He must learn to accept the decisions of the laboratory predicated upon its knowledge of the technique with which it deals.

The relationships between the physician, the epidemiologist, and the laboratory will improve with better coordination of effort. It takes the physician as long to handle specimens and reports from a poor laboratory as from a good one; it takes the laboratory as long to handle a useless specimen as a legitimate one. This wasteful gap needs reduction. We need to guard against the satisfaction that comes from taking a specimen, when that specimen is meaningless.

#### TENDENCIES IN OVER-CLASSIFICATION

One becomes dizzy at times with the present tendencies of bacteriologists to emulate the atom-cracking physicists. They are no longer content with a species of bacteria. They must needs divide them in groups, subdivide them into types, analyze these for genetic variants, check them for phase specificity, and then apply letters of half the alphabet to stages of their life cycles, somatic structure, flagellar components, virulence, and specific carbohydrate substance. If all this fails, there is the possibility of typing with bacteriophage. There are more than forty types of pneumococci; types of the medical students' anchor block, the typhoid bacillus, have passed the middle of the alphabet; and the varieties of *Salmonella* have reached astronomical figures. There are three kinds of diphtheria bacilli, if you look to your right; there are eight kinds, if you look the other way.

This chaotic condition is no more than a disorganized expression of the variation you see in your patients and designated as biologic flexibility. There have been no basic alterations in the principles of serologic reactions. The chemical, or antigenic, composition of organisms must vary almost from cell to cell. The only thing astonishing is the chaos of the descriptions. We can leave to the bacteriologists the argument about whether antigenicity should be used as a basis for defining varieties. Eventually bacteriologists will revert and reduce the number of kinds and everyone will be happier. The useful portion will then be more conspicuous. What is the useful portion?

Among the varieties of bacteria causing dysentery there have been only a few recognized types. Many physicians talk of Shiga, Hiss-Russell Y, Flexner, and Kruse. For sixteen years there has been talk of another type, isolated forty years ago by Duval—the Duval-Sonne type. This organism was overlooked for more than twenty years. It was present, it had been described, and only a short search was needed to identify it. For more than twenty years doctors sent specimens to the laboratory with inquiries about bacillary dysentery, often unrecognizable on clinical grounds alone, and received reports: "No dysentery bacilli found." Boyd, in England, has examined species from thousands of cases and has devised a cautious system of six definite groups, six more that he would like to study more before he defines them, and a couple of stubborn ones that will not fit in. Need

this throw our minds back in chaos? It need not. The chaos belongs to the bacteriologist. We do not care at all whether patients have Type II or Type VI paratyphenteric organisms, but we do care whether specimens we send in are positive or negative.

The epidemiologist is vitally interested in the confirmation of diagnoses. He has also another goal in which the private practitioner too often is not interested. He must trace the connections between cases. The many types of Boyd's dysentery bacilli and the endless types of pneumococci are short and simple compared to the *Salmonella*. We repeat that we are fortunately privileged to forget such thrills as the fact that paratyphoid C bacilli are listed as Roman VI, VII, indicating their somatic components; "c" indicating a specific phase flagellar component; and 1, 4 and 5 to indicate three group type flagellar components. We are interested in knowing that the organism is a *Salmonella* and not some organism resembling something else. Furthermore, the epidemiologist has a tool whereby he can trace a particular type of *Salmonella* to places circumstantially related in an epidemic. The chain which connects separate cases is tightened. A carrier is found in an area where cases of enteric infection have occurred. When the organism is a different type from the ones found in the surrounding cases the analysis of the epidemic changes entirely. This principle has been used in food poisoning and was used not long ago in California in connection with cases of typhoid fever from inadequately ripened cheese. It is the same as Sherlock Holmes' search for special kinds of tobacco. A knowledge of special blends led to the discovery of the murderer.

#### VIRUS INFECTIONS

Besides antigenic typing, serologic methods are being extended to diseases for which they were not used, notably in virus infections. How can anyone predict the Davidsohn test for infectious mononucleosis, the rH tests, or, for that matter, the Wassermann itself? Something is coming out of the bacteriologic escapades in serology. What about the laboratory and general sanitation? We have been confronted with technicians who dropped silk threads in disinfectants, made counts on milk, and looked for coli in water for so long a time that we may think these are settled issues. There is a legal difference between milk counting 10,000 and milk counting 15,000, but the accuracy implied is fictitious. Our concern is for safe milk, not quibbling over procedures which do not distinguish safe milk from unsafe milk.

#### SANITARY PROBLEMS

The advent of air-conditioning, the increase in use of ultraviolet light, and increased emphasis on respiratory infection may lead us to consider air in the same category with water and milk. We should then want the supportive aid of the laboratory. Couple together the Wells air centrifuge, selective culture media, several of which have already been suggested, and a respiratory organism like the alpha streptococcus or *Neisseria catarrhalis*, as numerous proportionally and nearly as frequent in the nose and throat as coli in the intestinal tract, and we have a procedure which health departments may one day find useful. Restaurants and beer parlors must raise the level of their sanitation. The public demands it. Sanitary inspectors face legal situations in making inspections and can use support from the laboratory as soon as this can be made available. A simple swab technique leads the way at present, but a few experiences in the courtroom of law and with lawyers will show you the complexities of relating science, pseudo-science, and human relationships. Not all of the difficulties are bacteriologic, yet a procedure which was sound scientifically and legally would be welcome.

Sanitation of foods is a part of this problem. We have mentioned Salmonella. There is likely to develop a series of procedures which will detect enterotoxigenic staphylococci. This would be helpful in tracing the sources of these staphylococci, now a source of conjecture.

#### IMMUNOLOGY

Immunology has for years been clouded and obscured by confusing its relationship with serology. Serology is concerned with reactions between antigens and antibodies. Immunology is concerned with resistance to infection, true immunity. The assumption that antibodies are the only means of preventing infection is gradually giving way. Antibodies sometimes are part of immunity but more often they are not. As explanations, they have failed more often than they have succeeded.

In the past few years, and just before the sulfa drugs and penicillin were so widely appreciated, there was increasing frankness in dealing with immunology. Men working with viruses discovered that most of them induced the formation of protective antibodies, detectable by their ability to neutralize the infectiousness of a suspension of virus experimentally.

The presence of these protective antibodies has often not correlated with the resistance to natural infection. This has led to the simple idea that an antibody results from an antigenic stimulus without necessarily any regard to immunity. The idea that antibodies must have a defensive function is anthropocentric, a teleologic concept. The idea of antigenic stimuli is old. Harmless bacteria and harmless substances induce the formation of antibodies as well as harmful ones. Typhoid vaccine is now thirty years old and with it our criterion for success has always been resistance to infection, true immunity, and not the presence of antibodies. Vaccination against smallpox is not presumed to depend on mere antigenic stimulus.

Biologic products are predicated upon the old concept of immunology, with one saving point only. The products are designed serologically but they must work effectively for the clinician; that is, immunologically. That is why there are so few widely accepted biologic products. A complete series of products could be made for every infection if only antigens and antibodies were considered.

The addition of sulfa drugs and penicillin to our armamentarium has diverted us from the old tenets of immunology that have hung on so tenaciously. The clinical success of these drugs, and perhaps tyrothricin or some yet to be discovered, is part of our immunologic future. They strengthen the case against traditional immunology and pave the way for a franker and less pompous attitude.

Finally, it should be evident from this short essay in the field of public health bacteriology how the practice of medicine has dominated its development. It is only by proceeding hand in hand with the medical profession that the public health official can win prestige and success. Health protection is a job of the health department and any scheme for sick care may react as an intrusion in a field in which our technical training may be inadequate. This may prove even hazardous to reputations when not working in the field of special competence and assuming the responsibility of others better equipped. It brings to mind the comment of W. Trotter in his *Collected Papers*, London, 1941, in which the curious but potential statement is made: "The lowly and junior profession of medicine, unlike its proud and elder sisters, has no direct influence in the work of government." The further statement is made: "The result is that, at a time when it is no longer possible to conceal the wholly unique importance of medicine for the very existence of social

life, our profession finds itself of all professions the least in command of social prestige, the least privileged, the most exposed, and the hardest worked."

#### CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH— 75TH ANNIVERSARY

This year we celebrate the 75th anniversary of the California State Board of Public Health. It may be of interest to all of you to know that the State of California had the honor of being the second Commonwealth in the Union to establish a State Board of Public Health.

It may be admitted that in our own brief lives we have become aware of the basic medical discoveries that have been made for increasing the life span and the happiness of mankind.

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#### FREE ENTERPRISE AND THE DOCTOR\*

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**S**ICKNESS insurance touches the lives of people so intimately and in theory is so tempting that it is always one of the first baits offered by planners for a socialized state. Bismarck introduced it into Germany in 1883; Lloyd George into England in 1912. In each case it was part of the rise of bureaucracy and the decline of representative government. It is one of the means by which men greedy for power gain control over the people and destroy their freedom. It is often said that liberty without subsistence is worthless. Franklin said that those who would trade freedom for subsistence are worthy of neither.

Americans hold liberty a priceless possession. When threatened by a foreign invader we spend life and treasure unhesitatingly. More slowly do we recognize the poison of foreign propaganda. Much contempt has been poured on the American system of economy. Never in history has any nation come so close to the four freedoms as ours, under the system of free enterprise. It is not by accident in our land that so many have so much. Freedom is a kindly soil for pioneering and for creative genius. Incentive causes men to take risks and to work more productively and enthusiastically than any slave.

#### ADVANTAGES OF FREE COMPETITION

True, abuses need to be corrected, monopolies curbed, wealth distributed. But we have the procedure within our constitution, and its two-party system to correct abuses. We have labor unions to bargain for their rights. We are not slaves. How then do we listen to the siren song of the socialized state which, Hayek has shown, leads directly to totalitarianism. We realize that some of our people do not have adequate food or housing or medical care. Does that prove that bureaucracy would be better? Russia before the revolution was not a starving nation. But after twenty-five years of totalitarian management, during which many millions starved, the general standard of living, despite lavish natural resources, is less for nine-tenths of its people than for our lowest tenth on relief during the depression. To curb the source of our wealth by bureaucratic control will leave less to distribute. The ultimate result will be not to make everyone rich but to make everyone poor. Capitalism is incompatible with totalitarianism because it connotes freedom. Freedom to purchase at the most favorable rate means competition. Competition by causing the failure

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